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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/608,549	06/30/2000	Gurumukh S. Tiwana	CISCP151	2362

22434 7590 05/03/2005

BEYER WEAVER & THOMAS LLP
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
DUONG, THOMAS	
ART UNIT	**PAPER NUMBER**
2145	

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/608,549	TIWANA ET AL.	
	Examiner	Art Unit	
	Thomas Duong	2145	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to the applicants Amendment filed on December 8, 2004. Applicant amended *claims 1, 18, 25, and 41*. *Claims 1-8 and 10-41* are presented for further consideration and examination.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. *Claims 1-8 and 10-41* are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US005634125) and further in view of Dreszer (US006442661B1).

4. With regard to *claims 1, 18, 25 and 41*, Li discloses,

- *a) when a new cache system starts up in a cache cluster having a plurality of total buckets, determining a full bucket allocation for the new cache system;* (Li, abstract; col.1, lines 18-37, lines 38-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

  Li teaches of a method for *"data redistribution process for adding a new node"* (Li, col.6, lines 18-19) to a database system *"where the new node is physically attached and registered to the parallel database network"* (Li, col.6, lines 20-21)

and *"the buckets of data to be moved to the new node are determined for each existing node"* (Li, col.6, lines 24-25). Hence, when a new node is added to the system, a data redistribution process takes place, wherein a portion of the buckets of data for each existing node redistributes to the new node.

- *b) periodically determining a load of the new cache system;* (Li, col.1, lines 18-37-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

  Li teaches that *"in the quiescent-mode operation, load balancing is the primary goal"* (Li, col.6, lines 52-53) implying that is very important to maintain a balanced workload among the existing nodes. Also, according to Li, *"while the description above has concentrated on a redistributing data when a new node is added into the parallel database system, the invention may also be used when the PDB system becomes imbalanced"* (Li, col.9, lines 4-7). Hence, Li not only teaches of redistributing the data buckets when a new node is added, but also using the technique once the system becomes imbalanced and thus requires a redistribution of the data buckets. Furthermore, Li admits as prior art that *"eventually, the system will become imbalanced across the nodes. Thus, the data will occasionally have to be redistributed to rebalance the load"* (Li, col.1, lines 50-52).

- *c) each time it is periodically determined that the new cache system is underloaded,* (Li, col.1, lines 18-37-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

  Li teaches that *"in the quiescent-mode operation, load balancing is the primary goal"* (Li, col.6, lines 52-53) implying that is very important to maintain a balanced

workload among the existing nodes. Also, according to Li, *"while the description above has concentrated on a redistributing data when a new node is added into the parallel database system, the invention may also be used when the PDB system becomes imbalanced"* (Li, col.9, lines 4-7). Hence, Li not only teaches of redistributing the data buckets when a new node is added, but also using the technique once the system becomes imbalanced and thus requires a redistribution of the data buckets. Furthermore, Li admits as prior art that *"eventually, the system will become imbalanced across the nodes. Thus, the data will occasionally have to be redistributed to rebalance the load"* (Li, col.1, lines 50-52).

- *d) each time it is periodically determined that the new cache system is overloaded,* (Li, col.1, lines 18-37-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

Li teaches that *"in the quiescent-mode operation, load balancing is the primary goal"* (Li, col.6, lines 52-53) implying that is very important to maintain a balanced workload among the existing nodes. Also, according to Li, *"while the description above has concentrated on a redistributing data when a new node is added into the parallel database system, the invention may also be used when the PDB system becomes imbalanced"* (Li, col.9, lines 4-7). Hence, Li not only teaches of redistributing the data buckets when a new node is added, but also using the technique once the system becomes imbalanced and thus requires a redistribution of the data buckets. Furthermore, Li admits as prior art that *"eventually, the system will become imbalanced across the nodes. Thus, the*

data will occasionally have to be redistributed to rebalance the load" (Li, col.1, lines 50-52).

- *wherein each bucket portion corresponds to a portion of the total traffic being handled by the cache cluster.* (Li, abstract; col.1, lines 18-37, lines 38-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

Li teaches of a method for *"data redistribution process for adding a new node"* (Li, col.6, lines 18-19) to a database system *"where the new node is physically attached and registered to the parallel database network"* (Li, col.6, lines 20-21) and *"the buckets of data to be moved to the new node are determined for each existing node"* (Li, col.6, lines 24-25). Hence, when a new node is added to the system, a data redistribution process takes place, wherein a portion of the buckets of data for each existing node redistributes to the new node.

However, Li does not teach,

- *slowly assigning a portion of the full bucket allocation when buckets have not been previously shed from the new cache system and slowly assigning a portion of previously shed buckets to the new cache system when buckets have been previously shed from the new cache system unless the cache cluster is operating at a maximum load; and*
- *shedding a portion of the buckets previously assigned to the new cache system,*

Dreszer teaches,

- *slowly assigning a portion of the full bucket allocation when buckets have not been previously shed from the new cache system and slowly assigning a portion of previously shed buckets to the new cache system when buckets have been*

previously shed from the new cache system unless the cache cluster is operating at a maximum load; and (Dreszer, col.2, line 65 – col.3, line 16; col.3, lines 49-60; col.4, line 49 – col.5, line 8; col.5, lines 42-65; col.5, line 66 – col.6, line 8; col.6, lines 9-31; col.6, line 55 – col.7, line 15; col.8, lines 14-25; fig.10-12; col.7, lines 61-65; col.12, lines 49-67; modules 70-72, fig.4)

Dreszer teaches of *"increasing/decreasing size queues in relation to memory requests (tuning) and performing trimming of size queues"* (Dreszer, col.7, lines 63-65) for a memory management system and, in particular, for a system cache buffer environment. Furthermore, Dreszer teaches of *"periodically reorganize/trim the size queue and attempt to release file system cache buffers back to the file system"* (Dreszer, col.12, lines 56-58).

- *shedding a portion of the buckets previously assigned to the new cache system,* (Dreszer, col.2, line 65 – col.3, line 16; col.3, lines 49-60; col.4, line 49 – col.5, line 8; col.5, lines 42-65; col.5, line 66 – col.6, line 8; col.6, lines 9-31; col.6, line 55 – col.7, line 15; col.8, lines 14-25; fig.10-12; col.7, lines 61-65; col.12, lines 49-67; modules 70-72, fig.4)

  Dreszer teaches of *"increasing/decreasing size queues in relation to memory requests (tuning) and performing trimming of size queues"* (Dreszer, col.7, lines 63-65) for a memory management system and, in particular, for a system cache buffer environment. Furthermore, Dreszer teaches of *"periodically reorganize/trim the size queue and attempt to release file system cache buffers back to the file system"* (Dreszer, col.12, lines 56-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Dreszer reference with Li reference to provide

rapid memory allocation and de-allocation, reduced memory fragmentation, maximizes the amount of memory available for a cache (e.g., file system I/O buffers) while optimizing the amount of memory available for other uses, and manages competition for different memory uses by system self-adaptation to different usage levels across different network environments and over time within one network environment, including self-tuning to optimize performance to a variety of environments and dynamic conditions.

5. With regard to *claims 2, 7-8, 10, 12-14, 19, 24, 26, 31-33 and 35-37*, Li and Dreszer disclose the invention substantially as claimed,

See *claims 1, 18 and 25* rejection as detailed above.

Furthermore, Li discloses,

- *assigning the full bucket allocation to the new cache system when the cache cluster is operating at a maximum load* (Li, abstract; col.1, lines 18-37, lines 38-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

6. With regard to *claims 3, 20 and 27*, Li and Dreszer disclose the invention substantially as claimed,

See *claims 1, 18 and 25* rejection as detailed above.

Furthermore, Dreszer discloses,

- *wherein slowing assigning a portion of the full bucket allocation to the new cache comprises: initials assigning a portion of the full bucket allocation to the new cache system; when no buckets have been previously shed, assigning a portion*

of the unassigned buckets to the new cache system; and when buckets have been previously shed, assigning a portion of a number of buckets that were previously shed from the new cache system. (Dreszer, abstract; col.2, line 65 – col.3, line 16; col.3, lines 49-60; col.4, line 49 – col.5, line 8; col.5, lines 42-65; col.5, line 66 – col.6, line 8; col.6, lines 9-31; col.6, line 55 – col.7, line 15; col.8, lines 14-25; fig.10-12)

7. With regard to *claims 4-6, 11, 21-22, 28-30 and 34*, Li and Dreszer disclose the invention substantially as claimed,

See *claims 1, 18 and 25* rejection as detailed above.

Furthermore, Dreszer discloses,

- *wherein shedding a portion of tree buckets previously assigned to the new cache comprises: when no buckets have been previously shed, periodically shedding a portion of the assigned buckets from the new cache system; when buckets have been previously shed, periodically shedding a portion of a number of buckets that were previously shed from the new cache system;* (Dreszer, abstract; col.2, line 65 – col.3, line 16; col.3, lines 49-60; col.4, line 49 – col.5, line 8; col.5, lines 42-65; col.5, line 66 – col.6, line 8; col.6, lines 9-31; col.6, line 55 – col.7, line 15; col.8, lines 14-25; fig.10-12; col.7, lines 61-65; col.12, lines 49-67; modules 70-72, fig.4)

8. With regard to *claims 15-17, 23 and 38-40*, Li and Dreszer disclose the invention substantially as claimed,

See *claims 4, 21 and 28* rejection as detailed above.

Furthermore, Li discloses,

- *wherein shedding a portion of tree buckets previously assigned to the new cache comprises: receiving load information from the new cache, the load information indicating whether the new cache system is overloaded; and using the load information to determine whether the new cache is overloaded.* (Li, abstract; col.1, lines 18-37, lines 38-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

Response to Arguments

9. Applicant's arguments with respect to *claims 1, 18, 25, and 41* have been considered but they are not persuasive.

10. With regard to *claims 1, 9, 12, 19, 29, 32 and 34*, the Applicants point out that:

- *The reference Li fails to teach any type of periodic monitoring of the load of a new cache system, and such a teaching cannot be implied since load balancing is not necessarily periodic.*
- *Even if one argues that Li teaches periodic monitoring of a new cache system, it is respectfully submitted that Li fails to teach a slow assignment of portions of the full bucket allocation to a new cache system when buckets have not been previously shed from such new cache system, in the manner claimed.*

However, the Examiner finds that the Applicants' arguments are not persuasive and maintains that Li and Dreszer disclose,

- *a) when a new cache system starts up in a cache cluster having a plurality of total buckets, determining a full bucket allocation for the new cache system;* (Li,

abstract; col.1, lines 18-37, lines 38-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

Li teaches of a method for *"data redistribution process for adding a new node"* (Li, col.6, lines 18-19) to a database system *"where the new node is physically attached and registered to the parallel database network"* (Li, col.6, lines 20-21) and *"the buckets of data to be moved to the new node are determined for each existing node"* (Li, col.6, lines 24-25). Hence, when a new node is added to the system, a data redistribution process takes place, wherein a portion of the buckets of data for each existing node redistributes to the new node.

- *b) periodically determining a load of the new cache system;* (Li, col.1, lines 18-37-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

Li teaches that *"in the quiescent-mode operation, load balancing is the primary goal"* (Li, col.6, lines 52-53) implying that is very important to maintain a balanced workload among the existing nodes. Also, according to Li, *"while the description above has concentrated on a redistributing data when a new node is added into the parallel database system, the invention may also be used when the PDB system becomes imbalanced"* (Li, col.9, lines 4-7). Hence, Li not only teaches of redistributing the data buckets when a new node is added, but also using the technique once the system becomes imbalanced and thus requires a redistribution of the data buckets. Furthermore, Li admits as prior art that *"eventually, the system will become imbalanced across the nodes. Thus, the data will occasionally have to be redistributed to rebalance the load"* (Li, col.1, lines 50-52).

- *c) each time it is periodically determined that the new cache system is underloaded,* (Li, col.1, lines 18-37-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)
  Li teaches that *"in the quiescent-mode operation, load balancing is the primary goal"* (Li, col.6, lines 52-53) implying that is very important to maintain a balanced workload among the existing nodes. Also, according to Li, *"while the description above has concentrated on a redistributing data when a new node is added into the parallel database system, the invention may also be used when the PDB system becomes imbalanced"* (Li, col.9, lines 4-7). Hence, Li not only teaches of redistributing the data buckets when a new node is added, but also using the technique once the system becomes imbalanced and thus requires a redistribution of the data buckets. Furthermore, Li admits as prior art that *"eventually, the system will become imbalanced across the nodes. Thus, the data will occasionally have to be redistributed to rebalance the load"* (Li, col.1, lines 50-52).
- *d) each time it is periodically determined that the new cache system is overloaded,* (Li, col.1, lines 18-37-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)
  Li teaches that *"in the quiescent-mode operation, load balancing is the primary goal"* (Li, col.6, lines 52-53) implying that is very important to maintain a balanced workload among the existing nodes. Also, according to Li, *"while the description above has concentrated on a redistributing data when a new node is added into the parallel database system, the invention may also be used when the PDB system becomes imbalanced"* (Li, col.9, lines 4-7). Hence, Li not only teaches of

redistributing the data buckets when a new node is added, but also using the technique once the system becomes imbalanced and thus requires a redistribution of the data buckets. Furthermore, Li admits as prior art that *"eventually, the system will become imbalanced across the nodes. Thus, the data will occasionally have to be redistributed to rebalance the load"* (Li, col.1, lines 50-52).

- *wherein each bucket portion corresponds to a portion of the total traffic being handled by the cache cluster.* (Li, abstract; col.1, lines 18-37, lines 38-54; col.2, lines 29-44, lines 48-61; col.6, lines 18-51; col.6, line 52 - col.7, line 53; col.9, lines 4-21; fig.6A; fig.9)

  Li teaches of a method for *"data redistribution process for adding a new node"* (Li, col.6, lines 18-19) to a database system *"where the new node is physically attached and registered to the parallel database network"* (Li, col.6, lines 20-21) and *"the buckets of data to be moved to the new node are determined for each existing node"* (Li, col.6, lines 24-25). Hence, when a new node is added to the system, a data redistribution process takes place, wherein a portion of the buckets of data for each existing node redistributes to the new node.

However, Li does not teach,

- *slowly assigning a portion of the full bucket allocation when buckets have not been previously shed from the new cache system and slowly assigning a portion of previously shed buckets to the new cache system when buckets have been previously shed from the new cache system unless the cache cluster is operating at a maximum load; and*
- *shedding a portion of the buckets previously assigned to the new cache system,*

Dreszer teaches,

- *slowly assigning a portion of the full bucket allocation when buckets have not been previously shed from the new cache system and slowly assigning a portion of previously shed buckets to the new cache system when buckets have been previously shed from the new cache system unless the cache cluster is operating at a maximum load; and* (Dreszer, col.2, line 65 – col.3, line 16; col.3, lines 49-60; col.4, line 49 – col.5, line 8; col.5, lines 42-65; col.5, line 66 – col.6, line 8; col.6, lines 9-31; col.6, line 55 – col.7, line 15; col.8, lines 14-25; fig.10-12; col.7, lines 61-65; col.12, lines 49-67; modules 70-72, fig.4)

  Dreszer teaches of *"increasing/decreasing size queues in relation to memory requests (tuning) and performing trimming of size queues"* (Dreszer, col.7, lines 63-65) for a memory management system and, in particular, for a system cache buffer environment. Furthermore, Dreszer teaches of *"periodically reorganize/trim the size queue and attempt to release file system cache buffers back to the file system"* (Dreszer, col.12, lines 56-58).

- *shedding a portion of the buckets previously assigned to the new cache system,* (Dreszer, col.2, line 65 – col.3, line 16; col.3, lines 49-60; col.4, line 49 – col.5, line 8; col.5, lines 42-65; col.5, line 66 – col.6, line 8; col.6, lines 9-31; col.6, line 55 – col.7, line 15; col.8, lines 14-25; fig.10-12; col.7, lines 61-65; col.12, lines 49-67; modules 70-72, fig.4)

  Dreszer teaches of *"increasing/decreasing size queues in relation to memory requests (tuning) and performing trimming of size queues"* (Dreszer, col.7, lines 63-65) for a memory management system and, in particular, for a system cache buffer environment. Furthermore, Dreszer teaches of *"periodically*

reorganize/trim the size queue and attempt to release file system cache buffers back to the file system" (Dreszer, col.12, lines 56-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Dreszer reference with Li reference to provide rapid memory allocation and de-allocation, reduced memory fragmentation, maximizes the amount of memory available for a cache (e.g., file system I/O buffers) while optimizing the amount of memory available for other uses, and manages competition for different memory uses by system self-adaptation to different usage levels across different network environments and over time within one network environment, including self-tuning to optimize performance to a variety of environments and dynamic conditions.

Therefore, the Applicants still failed to clearly disclose the novelty of the invention and identify specific limitation, which would define patentable distinction over prior art.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas Duong whose telephone number is 571/272-3911. The examiner can normally be reached on M-F 7:30AM - 4:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Valencia Martin-Wallace can be reached on 571/272-6159. The fax phone numbers for the organization where this application or proceeding is assigned are 703/872-9306 for regular communications and 703/872-9306 for After Final communications.

Thomas Duong (AU2145)

April 26, 2005

V. Martin Wallace

VALENCIA MARTIN-WALLACE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700